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The 1917 Annual Report on

the

Forest Insect Situation

In District Six

December 1917

C. J. Hamilton
Forest Examiner.

Approved:

December ___, 1917.

GEO. H. CECIL, District Forester.

By C. H. F. Acting.

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Introduction.

Although no opportunity was available during 1917 to do any field work in District Six on the insect problem, yet it is beyond question that the experience gained during the two months field work in Montana and the five months stay in California, together with the closer association with the work of the Branch of Forest Insect Investigations on the Pacific Coast and in the northern Rocky Mountain region, have enabled the writer to get a better understanding of the insect problems known to exist in this District.

The information under the heading "Status of the Infestations" has been obtained largely from Forest officers on the various Forests, some of whom have had actual experience in insect reconnaissance and insect control work. During June and July, 1916, the writer made personal observations on the insect situation on the Ochoco, Fremont, and Crater National Forests. None of the other Forests have yet been visited.

Status of the Known Infestations.

Columbia National Forest.

Late in the fall of 1916, Supervisor Brundage reported an infestation in a rather valuable stand of immature white pine in the vicinity of Indian Race Track on the Columbia. The damage was confined to perhaps one thousand acres.

The infestation was not studied during the past field season, but judging from reports by the local rangers, it seems evident that the infestation had not greatly increased during 1917.

This is probably the first instance in this District where any concentrated damage by the mountain pine beetle in white pine stands has been reported. It is the purpose of the writer to study this area sufficiently early during this coming spring to enable the inauguration of control work, provided that such control measures are found to be advisable and the money for them can be made available.

Crater National Forest.

During the past eight or ten years there has been a rather constant loss in the yellow pine stands of the Applegate Division of this forest as a result of the work of the western pine beetle. Although these depredations have been going on over an area of from two hundred thousand to three hundred thousand acres, yet the yellow pine stands which are being affected are almost entirely of an exceedingly open and scrubby character, and of low commercial value. The annual insect loss in some parts of this area has amounted to considerably over one per cent, while perhaps for the infestation as a whole the annual damage has, during the past ten years, averaged one-half of one per cent.

The Pacific Slope Station at Ashland has had this in-

festation under close observation since 1915. In 1916, this Station cruised 160,000 acres of the area rather carefully, and intensive studies are being made on individual portions of it. During the past year there has been a sudden decline in the severity of the insect attacks, but whether or not this fluctuation is only a temporary one cannot be predicted. However, the Ashland Station has fully agreed that because of the low commercial value of the major portion of the yellow pine in this infestation unit, no control measures are justifiable.

Fremont National Forest.

During the fall of 1913 an epidemic infestation in the lodgepole stands of what was then the Paulina National Forest covered about 30,000 acres. In the fall of 1913, this infestation was at its height and although the damage was confined almost entirely to lodgepole pine within the Forest boundaries, the owners of valuable yellow pine stands adjacent to this heavy mountain pine beetle epidemic feared that considerable damage would be done to their timber when this vast number of beetles emerged from the lodgepole. Inasmuch as no satisfactory cooperation could be secured from the private owners in the control of this infestation, no control work was done during the spring of 1914. However, it was during 1914 that there occurred a most remarkable decrease in the entire infested area. Investigations by the Bureau of Entomolo-

gy in this area during 1914, indicated that a large percentage of the brood had emerged from the lodgepole, but where they disappeared to after their emergence is still a mystery. During the late spring of 1914, and about the time of the emergence of these insects, unusually strong and constant winds blew from the North. That the insects were driven southward and widely scattered by these winds is a theory which has been advanced by some to explain the sudden decline of this infestation.

During 1915 and 1916 there were still further decreases in the severity of the depredations, and in 1917 the attack was of a quiescent and endemic character. Most of the area which was included in the original infestation is no longer National Forest land.

As revealed by the studies of the Branch of Forest Insect Investigations, the mountain pine beetle damage to yellow pine in this area since 1914, and even during 1913 when the infestation was at its height, has been negligible. In fact, it is believed that the occasional yellow pine trees killed by the western pine beetle as a result of merely an endemic or normal infestation, is of far greater consequence.

During 1917 a small concentrated attack by the mountain pine beetle in lodgepole and yellow pine was discovered in the extreme northern end of the originally epidemic area. This will receive early attention during the coming

field season.

Ochoco National Forest.

In the Badger Creek watershed on this Forest an epidemic infestation in the lodgepole and yellow pine by the mountain pine beetle was finally wiped out by control work during the years 1912, 1913, and 1914, at a cost of approximately $10,000. In 1912 only a portion of this 8,000 acre watershed was covered by control measures. In 1913 the entire watershed was gone over, and a recleaning was made of the area included in the 1912 work. In 1914, the whole watershed was thoroughly cleaned again. In 1915, a few scattered lodgepoles were infested, and in 1916, the number of infested lodgepoles had become even less, and the only loss in yellow pine was confined to a small number of trees killed by the western pine beetle. Local Forest officers reported that in 1917 the Badger Creek area was still clean.

The purpose of this control work was entirely the protection of yellow pine. The Bureau of Entomology has since this work been advocating the host selection principle. When applied in control work to infestations such as was worked several years ago in Badger Creek, and when only yellow pine is worth protecting, this principle makes necessary only the removal of the yellow pine. In Jackson Creek and Happy Camp Creek east of the Badger Creek watershed, there still exists a rather

virulent mountain pine beetle attack in lodgepole and yellow pine, the yellow pine being of good quality and nearly as high in commercial value as that in Badger Creek. If field study during the coming season indicates that there are no immediate prospects of a decline of the infestation in the Jackson Creek and Happy Camp Creek watersheds, steps will be taken to secure the immediate cooperation of the Pacific Slope Insect Station at Ashland for an intensive study of these areas with a view to subsequently applying both the host selection and percentage principles in control work on these two rather small watersheds, provided that there is a possibility of securing an allotment for such control measures. The host selection principle as applied to infestations by the mountain pine beetle in yellow pine and lodgepole, has never been given a try-out in any control project, and it seems logical to apply it first to such small infestations as now exist on the Ochoco than on a much larger and more expensive scale on a large area such as the Missoula-Flathead epidemic.

Whitman National Forest.

The control project carried on on this Forest at an expenditure of almost $33,000 in 1911, is the largest single insect control project ever carried on in the West and yet, aside from the consideration of whether or not this expenditure was justified by the resulting protection to adjacent

yellow pine stands, the results from the investigation standpoint have not been commensurate with the size and cost of the project. At the time of the control work on the Whitman, a similar large epidemic was raging in the yellow pine-lodgepole stands on the Wallowa. Inasmuch as the Whitman and the Wallowa National Forests are both in the same general region, a most valuable study would have been possible subsequent to 1911 in comparing the decline of the infestation on the Whitman on which control measures had been carried on, with the progress of the undisturbed epidemic on the Wallowa.

Although six years have elapsed since the control work on the Whitman, an insect cruise of the Whitman and Wallowa for comparative purposes is still contemplated, and the Bureau of Entomology has promised the assistance of one of the men at the Pacific Slope Station to assist in this work during the coming spring. The preliminary plans for this survey have already been taken up with the Pacific Slope Station and Dr. A. D. Hopkins. The final detailed plans for the work and the methods to be followed will be worked out cooperatively between the Forest Service and the Bureau of Entomology.

Very little is definitely known about the present status of the infestation on the Whitman. Detailed surveys made in 1913 and 1914 by Mr. W. D. Edmonston of the Bureau of Entomology revealed a rapid decline in the infestation which

was attributed to the 1911 control work.

Other Infestations.

From time to time reports have been received of insect damage in white pine, Douglas fir, Sitka spruce, and larch, from various parts of the District, but the conditions are not considered to be worthy of as serious consideration as the western pine beetle and mountain pine beetle depredations in yellow pine.

The Mountain Pine Beetle in Lodgepole - Yellow Pine Stands

In this District there are two insect problems which in importance far exceed the others. These are, briefly, the mountain pine beetle infestations in the lodgepole-yellow pine stands, and the western pine beetle attacks in the yellow pine timber.

Wherever lodgepole occurs there is found mountain pine beetle attacks in that species, either in what might be termed quiescent attacks, or in the form of epidemics. It is only when these quiescent attacks develop into epidemics that any damage is done in the lodgepole-yellow pine stands to yellow pine. During the past ten or twelve years observations have been made on a number of such epidemics in this District, particularly on the Wallowa, Whitman, Malheur, Ochoco and the former Paulina National Forest, and it has been found that

these epidemics are rarely dangerous for a maximum period of more than from five to seven years, and that in a few cases the time elapsing between a rapid increase from normal conditions and a return to this quiescent condition has been only three years. This relatively short "damage period" should play an important part in the consideration of the desirability of control measures. Control measures carried on in such infestations when they already are on the rapid decline may often be a waste of money.

Ordinarily there are many more lodgepole than yellow pine infested in these attacks, and prior to 1913, it was believed that the disposition of both the infested lodgepole and yellow pine was necessary even where only the protection of yellow pine was deemed necessary. However, with the advent of the host selection principle developed by the Bureau of Entomology, there seems to be little or no relation between the infestation in the yellow pine and that in the lodgepole in mixed stands of the two species. This brings the protection of yellow pine in such depredations within the range of financial possibility. There is an urgent need for carrying out this principle on some smaller projects in order that when necessity arises control measures giving full regard to this principle can be applied to larger and more expensive situations with fuller assurance.

The Western Pine Beetle in Yellow Pine

In contrast with the spectacular nature of the mountain pine beetle depredations in our lodgepole-yellow pine stands, which flare up and then die down just as quickly, is the slow and insidious work of the western pine beetle, and which, because of its relatively slow progress, is very apt to be overlooked or disregarded by Forest officers. Unlike the Black Hills beetle in the Black Hills, or the mountain pine beetle in the lodgepole of Montana, the western pine beetle in Oregon, even in the very worst epidemics, rarely kills more than two per cent of the yellow pine stand in any one year, and ordinarily epidemic damage from this insect is less than an annual one per cent. Even with this relatively small amount of annual damage, the western pine beetle problem in Oregon is of real importance for two reasons. In the first place epidemics by this insect usually are of long duration, ten or fifteen years is not uncommon, and still longer periods of rather constant damage seem probable with the evidence already at hand. In the second place, the very best timber is killed in epidemic depredations by this insect.

In Oregon, rarely more than 100 trees per section are killed annually in yellow pine stands when involved in epidemic attacks. When it is remembered that these epidemics are of long duration and destroy the best timber, not only is the importance of the problem more apparent, but it also becomes

evident that the investment of money for control measures in these attacks is much more apt to result in tangible protection than similar work in our spectacular and short-lived mountain pine beetle invasions in the lodgepole-yellow pine stands.

Other Insect Problems.

Thus far but very little attention has been given to insect damage to Douglas fir. The general impression of the entomologists who have studied the insects in the Douglas fir type is that the insect depredations in this species are negligible on the Pacific Coast. No reports of extensive losses in this species in western Oregon or western Washington have ever been made. In District Six, the Douglas fir losses are greatest in portions of eastern Oregon and southeastern Washington on the drier sites, but even here concentrated attacks of any consequence are not known to exist.

During the past five or six years reports have been received from Sitka spruce owners in the Coos Bay and Grays Harbor region of rather heavy losses due to insects. These reports have been referred to the Bureau of Entomology. A number of years ago the Bureau of Entomology established an insect station at Hoquiam, Washington, to determine the cause of these losses, but unfortunately insufficient damage occurred to Sitka spruce during the existence of the station to enable definite conclusions. Inasmuch as damage to Sitka spruce undoubtedly occurs on National Forest lands also, it is planned

to give this problem some attention as soon as the opportunity presents itself.

The only other species in which damage by insects has been recorded are the white pine and western larch. In the case of white pine, the mountain pine beetle is responsible for most of the losses, while a species of Tetropium (a Cerambycid borer) is causing trouble in the larch of northeastern Oregon. Inasmuch as both white pine and larch are of lesser commercial importance in this District, it is not believed further attention to insect damage in these two species is as urgent as in the case of yellow pine or even Douglas fir.

Prerequisites for the Solution of these Problems.

The first question which arises after it has been decided to carry on control work on an infested area is that of how much of the infested timber it is necessary to remove to bring about effective control without the necessity of continuing the work for more than one season.

The second question is in regard to the infestation unit. Very often, one could almost say usually, our infestations cover many thousands of acres at the same time.° To extend control measures over all of this large area in one year is

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°It has gradually become evident that most of our infestations rise and fall simultaneously over large areas, and do not have their beginnings in small localized centers. The 1917 California insect survey, and the recent general decline of the epidemic infestations over large parts of the Klamath and Rogue River watersheds emphasized this again.

often impossible both from the financial and administrative standpoint. As a result, it becomes necessary to divide the large infestation into so-called infestation units, any individual one or more of which can be safely left or treated without regard to the others. The problem of what constitutes an infestation unit is therefore as important a problem as that of determining the percentage of the infested timber to remove. Briefly, in order to intelligently apply any percentage we must first know on what area it should be applied in such quite usual cases where an infestation covers several hundred thousand acres at one time, and all of which it is not possible to work in any one year.

The so-called "Ashland Conference Plan", which has the approval of both the Forest Service and the Bureau of Entomology, has in view the concrete working out of the "infestation unit and percentage principle" difficulties. That such a thing as the percentage principle is operative, and that infestation units really exist, the Bureau of Entomology has demonstrated, but it is the actual application of these matters to control work on which this District, as well as the other Districts, needs assistance. For this reason, the carrying out of the "Ashland Conference Plan Projects" is urged. Two control projects for this purpose have already been recommended by the Bureau of Entomology, one is entirely within the Sequoia National Park, and the other is on both

the Sequoia National Park and the Sequoia National Forest. Two check areas are feasible, one entirely within the Sequoia National Park, and the other entirely on the Sequoia National Forest.

The data which it is hoped to obtain from these investigative projects have a wide application, and seem almost prerequisites to the successful and efficient execution of any control project in this District.

There is no reasonable doubt at this time that our expensive epidemic infestations result ultimately from what we now call normal infestations. This fact, together with the reasonable certainty that our large and destructive infestations result from a simultaneous increase of small infestation nuclei over large areas, makes it apparent that the study of the feasibility of controlling endemic or normal infestations over large areas may yield valuable results. This matter has been brought to the attention of the Pacific Slope Station at Ashland, Oregon. For a number of years Mr. Ralph Hopping, in charge of insect control work on the National Forests of California, has advocated the trying out of this policy. In advocating this policy, Mr. Hopping recognises the fact that endemic infestation could be removed over a large area of commercial timber at the cost of an epidemic on a much smaller area. Inasmuch as this method has not been given a real trial, and since the ultimate results of its application including the

financial advantages of such a procedure are therefore still unknown, it is a matter on which we need the advice and assistance of the Bureau of Entomology.

Summarizing Statement

Unless the situation on the Columbia National Forest is found to be a dangerous one, no allotments for control work are recommended for the fiscal year ending June 30, 1918.

It is hoped that opportunity will be afforded to carry on the field studies recommended in this report, and that still closer cooperation with the Pacific Slope Station at Ashland, Oregon, will be found possible in order that the problems underlying effective control work may gradually become better understood.

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